Patent Claims

1. A method for electroplating,
having the following steps:
application of an electrically conductive basic layer (22) to a substrate (12),
application of an auxiliary layer (24) having better electrical conductivity in comparison with the basic layer (22) after the application of the basic layer (22),
application of a mask layer (26) after the application of the auxiliary layer (24),
production of a mask with at least one mask opening (28) from the mask layer (26),
patterning of the auxiliary layer (24) using the mask, the basic layer (22) not being patterned or not being completely patterned according to the mask,
electroplating of at least one layer (50, 52) in the mask opening (28) after the patterning of the auxiliary layer (24).

2. The method as claimed in claim 1, characterized by the following steps:
electroplating with a current density in an initial phase,
electroplating with a higher current density in comparison with the current density during the initial phase in a main phase following the initial phase.

3. The method as claimed in claim 1 or 2, characterized in that the current density in the initial phase has a value of less than 50 percent of the current density in the main phase,
and/or in that the initial phase is longer than 5 seconds and/or shorter than 5 minutes,
and/or in that the current density in the main phase is greater than 0.2 ampere per square decimeter and/or less than 10 amperes per square decimeter.

4. The method as claimed in one of the preceding claims, characterized by the following steps:
application of an insulating layer (18) prior to the application of the basic layer (22),
patterning of the insulating layer (18) with production of a contact opening (20) prior to the application of the basic layer (22),
and preferably application of a part of the basic layer (22) in the contact opening (20).

5. The method as claimed in one of the preceding claims, characterized in that the basic layer (22) is a barrier layer against copper diffusion,
and in that the auxiliary layer (24) contains copper or comprises copper.

6. The method as claimed in one of the preceding claims, characterized by the following steps:
electroplating of a base layer (50),
electroplating of a covering layer (52) after the electroplating of the base layer (50), the base layer (50) comprising a different material than the covering layer (52).

7. The method as claimed in claim 6, characterized in that the material of the base layer (50) has a melting point of greater than 500 degrees Celsius,
and in that the material of the covering layer (52) has a melting point of less than 400 degrees Celsius.

8. The method as claimed in one of the preceding claims, characterized in that the patterning of the auxiliary layer is carried out by means of a galvanic method, preferably in the same installation as the electroplating of the layer (50, 52) in the mask opening (28).

9. A contact projection arrangement (10),

which contains in the following order with increasing distance from a substrate (12) of an integrated ciruit:
an electrically conductive interconnect (16) or connection plate,
an electrically conductive basic layer (22),
adjoining the basic layer (22) a copper-free base layer (50) made of a material having a melting point of greater than 500 degrees Celsius,
an electrically conductive solder material layer (52) having a melting point of less than 400 degrees Celsius.

10. The contact projection arrangement (10) as claimed in claim 9, characterized in that the base layer (50) comprises nickel or nickel-phosphorus, or contains at least 60 atomic percent of nickel.

11. The contact projection arrangement (10) as claimed in claim 9 or 10, characterized in that a boundary layer made of binary or multiphase compounds, in particular made of a ternary compound, is present at the boundary between base layer (50) and solder material layer (52).

12. The contact projection arrangement (10) as claimed in one of claims 9 to 11, characterized in that the interconnect (16) or the connection plate contains at least 80 atomic percent of aluminum, or in that the interconnect (16) or the connection plate contains more than 50 atomic percent of copper, and/or in that the solder material layer (52) comprises a tin alloy, in particular a tin-silver alloy or a tin-lead alloy or a tin-silver-copper alloy or a tin-silver-bismuth alloy, or contains a tin alloy, in particular a tin-silver alloy or a tin-lead alloy or a tin-silver-copper alloy or a tin-silver-bismuth alloy,
and/or in that the basic layer (22) forms a diffusion barrier for copper,

and/or in that the basic layer (22) comprises titanium-tungsten or contains titanium-tungsten, the proportion of titanium preferably being less than 20 atomic percent,
and/or in that the basic layer contains a layer stack made of a plurality of component layers, the layer stack containing at least one of the following layers: a titanium layer, a tantalum layer, a titanium nitride layer, a tantalum nitride layer, a tungsten layer, a titanium-tungsten layer or a titanium-tungsten nitride layer.

13. The contact projection arrangement (10) as claimed in one of claims 9 to 12, characterized in that the basic layer (22) adjoins the interconnect (16) or the connection plate,
and/or in that the base layer (50) adjoins the solder material layer (52).

14. The contact projection arrangement (10) as claimed in one of claims 9 to 13, characterized by an electrically insulating layer (18) with a cutout (20) in which at least part of the basic layer (22) and part of the base layer (50) are arranged.